What is claimed is:

1. A magnetic recording system comprising

a multilevel magnetic recording medium comprising a substrate and a plurality of spaced-apart magnetic islands on the substrate, each island comprising at least two stacked magnetic cells, each cell in an island being separated from the other cells in its island and having a magnetic moment oriented in one of two opposite directions substantially perpendicular to the substrate; and

an inductive write head including an electrical coil for generating magnetic fields generally perpendicularly to the substrate, the head being capable of switching the orientation of the moment of one cell in an island without switching the orientation of the moments of the other cells in that island.

2. The system of claim 1 further comprising a current source coupled to the coil and capable of generating current in two directions.

3. The system of claim 2 wherein the current source is capable of generating current in two directions and with at least two different values in each direction.

4. The system of claim 1 wherein the head is a longitudinal head having fringe fields oriented generally perpendicularly to the substrate.

5. The system of claim 1 wherein the head is a perpendicular head.

6. The system of claim 1 wherein the head is a cantilever probe having a probe tip, the probe tip being formed of magnetic material.

7. The system of claim 2 further comprising a heater for heating an island.

8. The system of claim 7 wherein the inductive head has a write pole and wherein the heater is located adjacent the write pole.

9. The system of claim 7 wherein the inductive head has two poles and wherein the heater is located between the two poles.

10. The system of claim 7 wherein the heater is an electrically resistive heater.

11. The system of claim 1 wherein the system is a disk drive and the medium is a rotatable disk, and wherein the islands are arranged on the substrate in generally concentric tracks.

12. The system of claim 8 further comprising an actuator coupled to the head for moving the head across the tracks.

13. The system of claim 9 wherein the head is a magnetic force microscopy probe having a cantilever and a probe tip at one end of the cantilever, and wherein the other end of the cantilever is attached to the actuator.

14. The system of claim 1 wherein the system is a scanning probe system and wherein the islands are arranged on the substrate in an x-y array and the head is a cantilever probe having a probe tip, the probe tip being formed of magnetic material, the probe tip and array of islands being movable relative to one another in x and y directions.

15. The system of claim 11 wherein the islands in the x-y array are grouped into array sections and further comprising a plurality of cantilever probes, each probe being associated with an array section and each probe and its associated array section being movable relative to one another in x and y directions.

16. The system of claim 1 wherein each island includes a layer of nonmagnetic material between the stacked cells for separating the cells.

17. The system of claim 1 wherein the islands are spaced apart by voids.

18. The system of claim 17 wherein the substrate is patterned into a plurality of pillars and wherein the islands are formed on the pillars.

19. The system of claim 1 wherein the islands are spaced apart by spacing material formed on the substrate between the islands and having substantially no perpendicular magnetic anisotropy.

20. The system of claim 19 wherein the spacing material is nonmagnetic.

21. The system of claim 1 wherein there are only two cells in each island.

22. The system of claim 1 wherein each cell is a multilayer of alternating layers of a first material selected from the group consisting of Co and Fe and a second material selected from the group consisting of Pt and Pd, said multilayer having magnetic anisotropy substantially perpendicular to the substrate.

23. The system of claim 1 wherein each cell is formed of a ferromagnetic material comprising one or more of Co, Ni, Fe and alloys thereof.

24. The system of claim 23 wherein each cell is formed of a ferromagnetic material comprising an alloy of Co and Cr having a magnetocrystalline anisotropy substantially perpendicular to the substrate.

25. The system of claim 24 wherein each cell is formed directly on a growth enhancing sublayer.

26. The system of claim 25 wherein the growth enhancing sublayer is formed of a material selected from the group consisting of Ti, TiCr, C, NiAl, SiO_2 and CoCr, where Cr is about 35-40 atomic percent in the CoCr sublayer.

27. The system of claim 1 wherein the cell closest to the substrate in each island has a magnetic coercivity greater than the magnetic coercivity of the other cells in its island.

28. The system of claim 1 further comprising an underlayer on the substrate beneath the islands.

29. The system of claim 28 wherein the underlayer is a soft magnetically permeable underlayer of material selected from the group consisting of NiFe, FeAlSi, FeTaN, FeN, CoFeB and CoZrNb.

30. A magnetic recording disk drive comprising:

a multilevel magnetic recording disk comprising a substrate and a plurality of spaced-apart magnetic islands on the substrate, each island comprising at least two stacked magnetic cells and a nonmagnetic spacer layer between said at least two cells, each cell in an island having a magnetic moment oriented in one of two opposite directions substantially perpendicular to the substrate, the cell closer to the substrate in each of the islands having a coercivity greater than the other cells in the islands; and

an inductive write head including an electrical coil for generating magnetic fields generally perpendicularly to the substrate, the head being capable of switching the orientation of the moment of one cell in an island without switching the orientation of the moments of the other cells in that island.

31. The disk drive of claim 30 further comprising a current source coupled to the coil and capable of generating current in two directions.

32. The disk drive of claim 31 wherein the current source is capable of generating current in two directions and with at least two different values in each direction.

33. The disk drive of claim 30 wherein the head is a longitudinal head having fringe fields oriented generally perpendicularly to the substrate.

34. The disk drive of claim 30 wherein the head is a perpendicular head.

35. The disk drive of claim 30 further comprising a heater for heating an island.

36. The disk drive of claim 35 wherein the inductive head has a write pole and wherein the heater is located adjacent the write pole.

37. The disk drive of claim 35 wherein the inductive head has two poles and wherein the heater is located between the two poles.

38. The disk drive of claim 35 wherein the heater is an electrically resistive heater.